# Project Status Update

# Dry Creek Bypass Pipeline Draft Feasibility Study

**HDR**

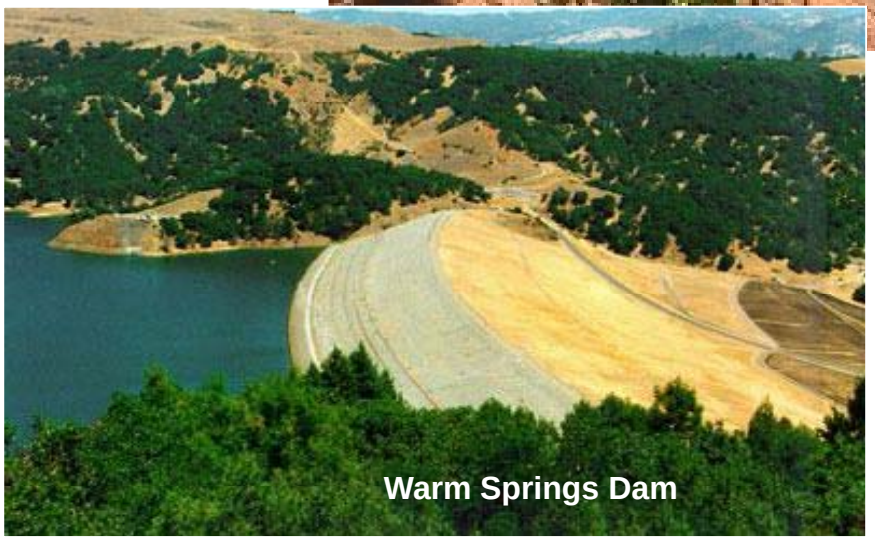
In collaboration with

**Kennedy Jenks**

May 2010

# Presentation Agenda

- Project Overview
- Alternatives Evaluation
  - Inlet
  - Pipeline  Alignment
  - Outlet
- Preferred Alternative



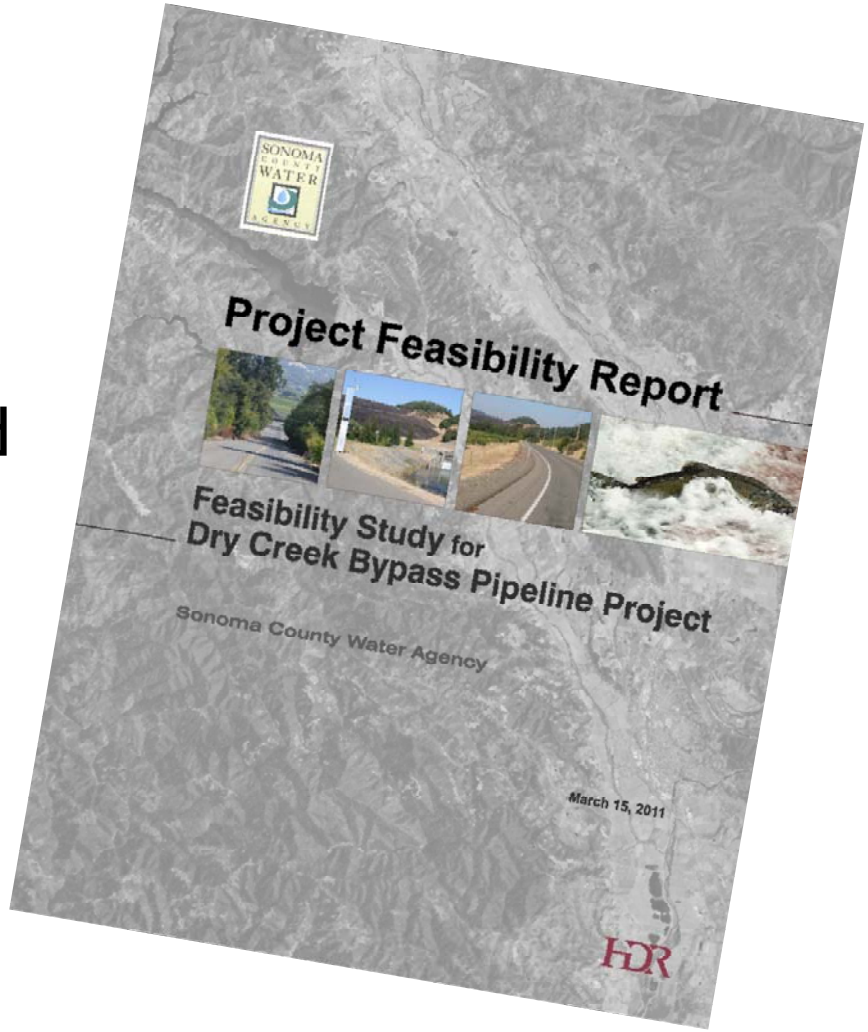
Warm Springs Dam

# Project Need

- Biological Opinion limits flow in Dry Creek during high water demand periods
- Bypass pipeline would convey flows that cannot be sustainably managed in Dry Creek

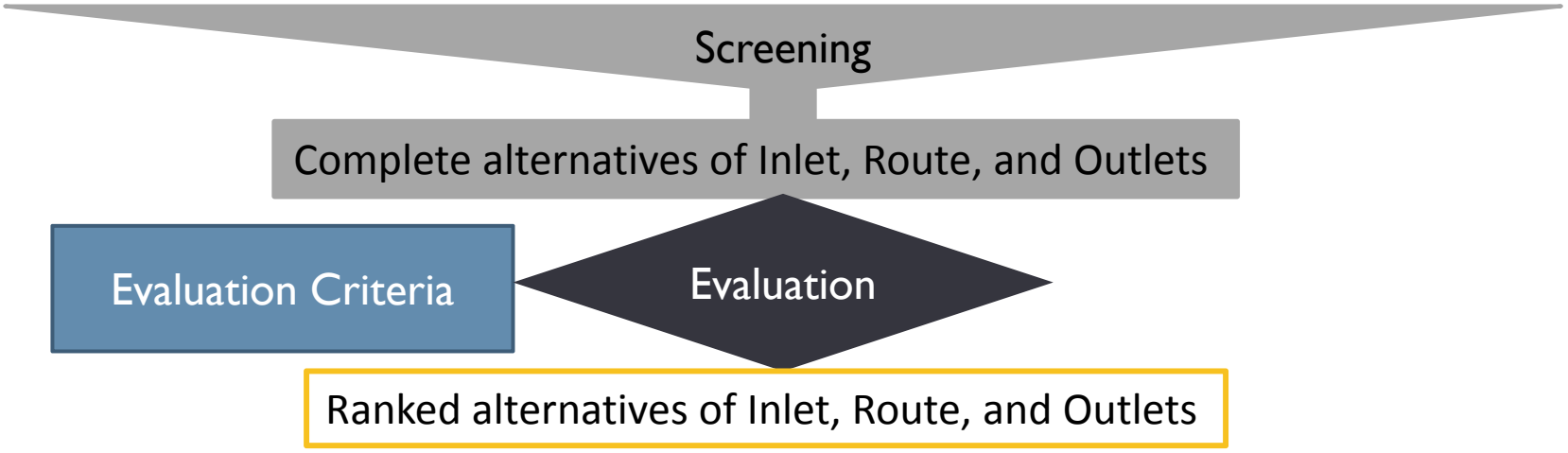
# Project Objectives

- Identify the Most Advantageous Project
  - Inlet
  - Pipeline Alignment
  - Outlet
- Define Project, Permitting, and Regulatory Requirements
- Define Capital and Operating Costs

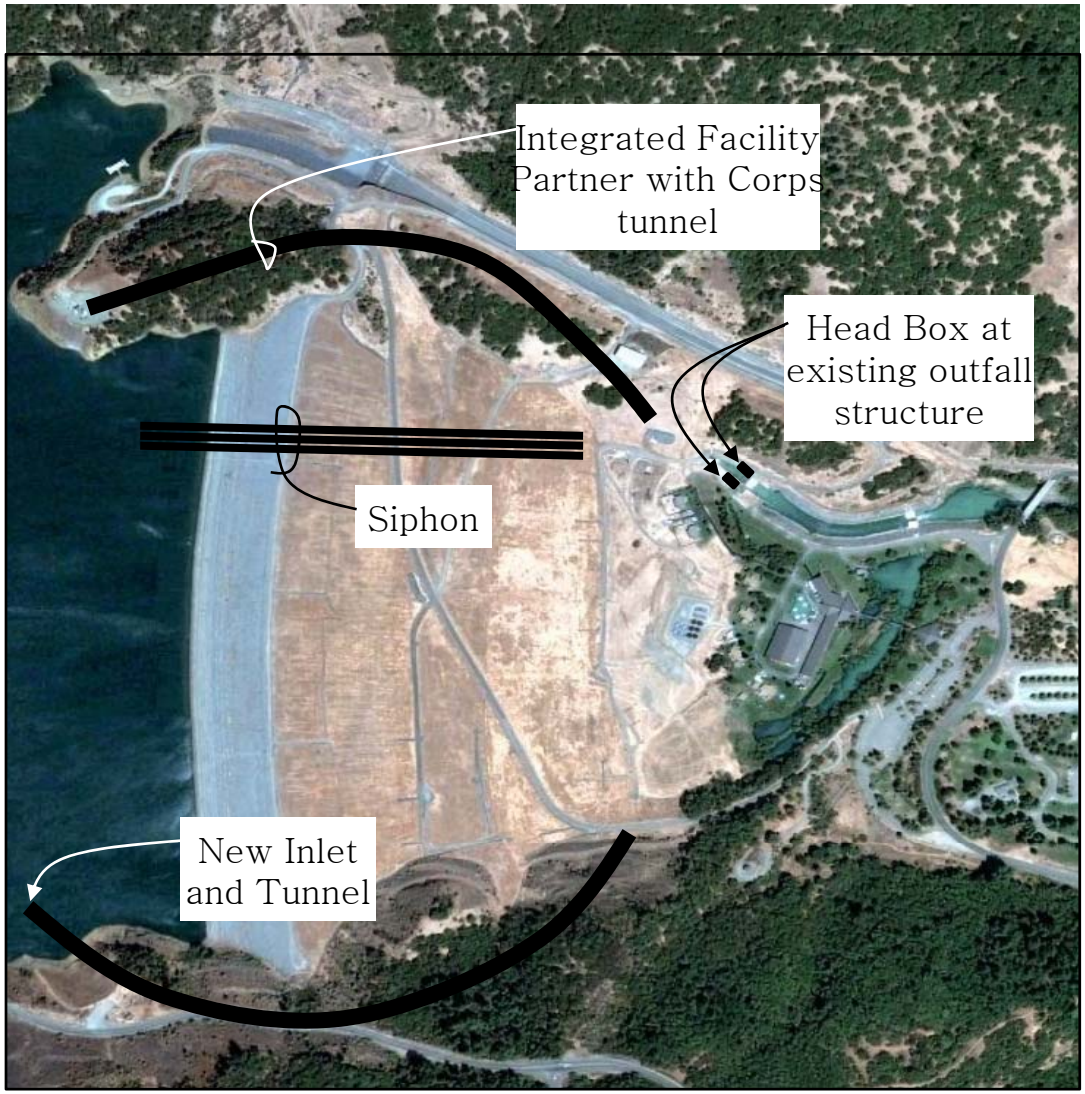


# Screening and Evaluation Process

| Inlet Options | Pipeline Routes | Outlet Options |
|---|---|---|
| Headbox at Stilling Basin | Northern | Dry Creek |
| Siphon over Dam | Central | Russian River |
| New Works at Left Abutment | Southern | |
| Tie to Existing Control Tower | | |



# Inlet Options



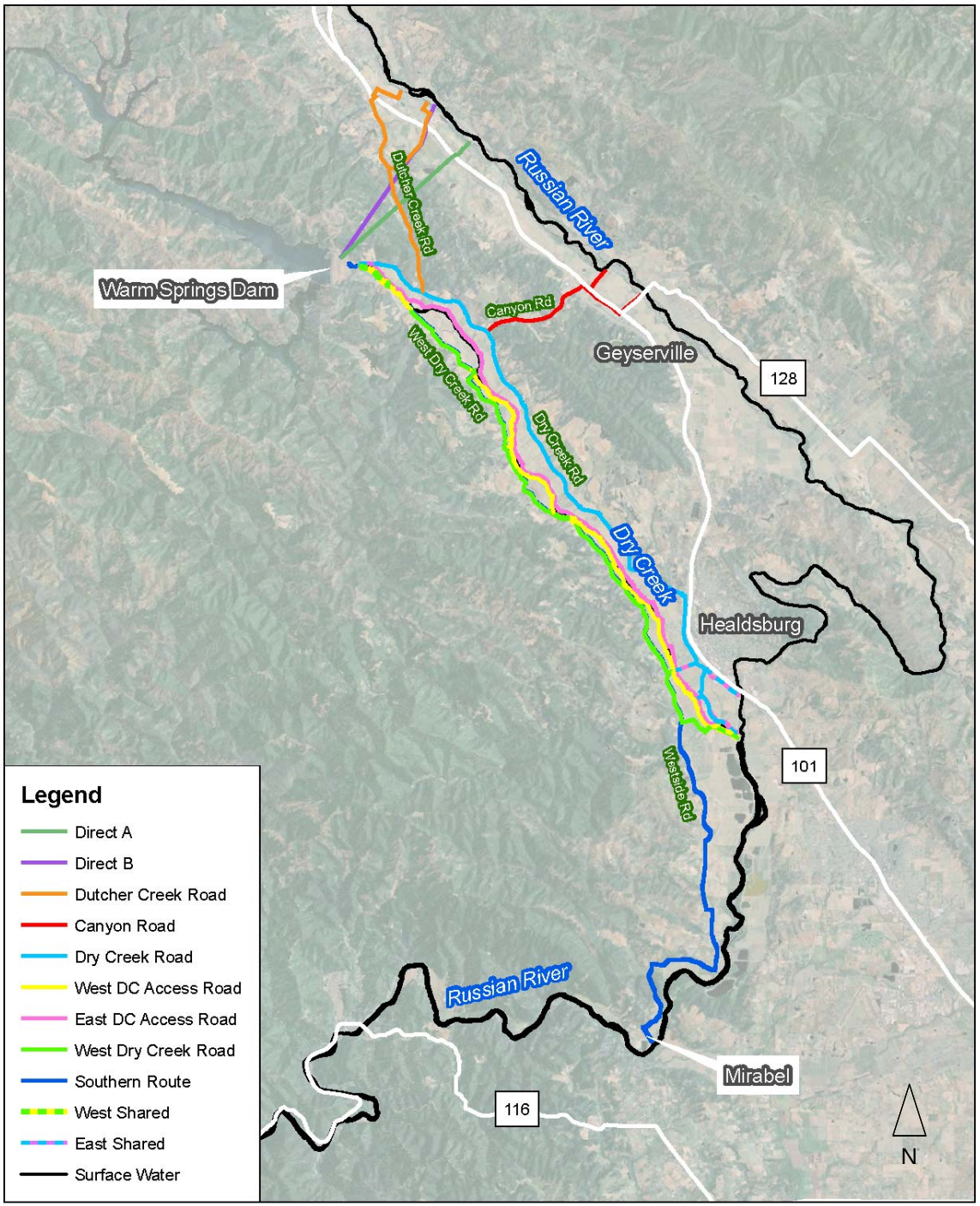

- Stand Alone Facilities
  - New outlet facility through left abutment
  - New head bay adjacent to existing stilling basin
  - Siphon system over dam
- Integrated Facilities
  - New tunnel/pipeline tapping into existing wet well

# Inlet Screening

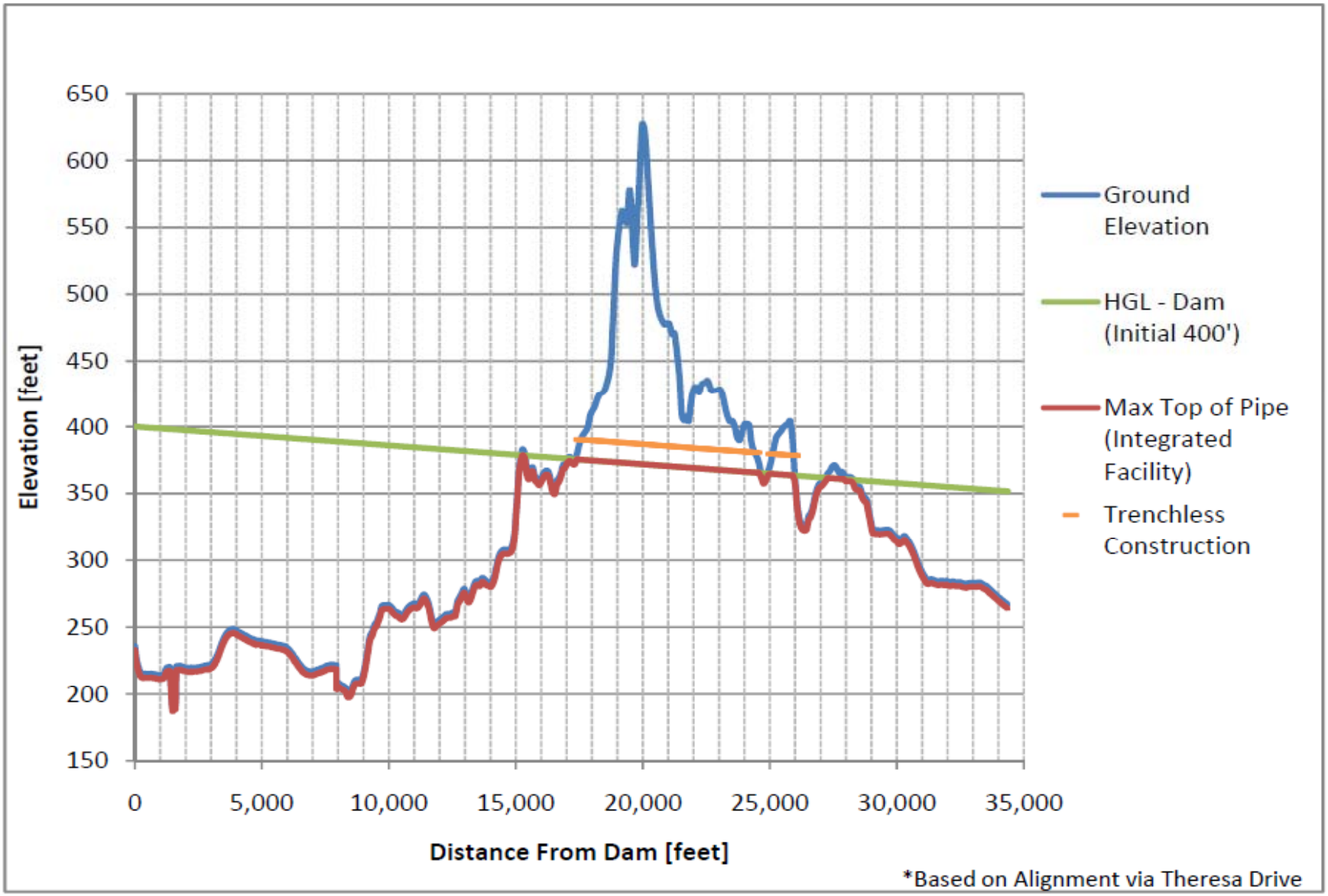
| Option | Design & Construction | Facility Operability |
|---|---|---|
| Head Box Adjacent to Stilling basin | Satisfactory | Satisfactory |
| Siphon Over Existing Dam | Unacceptable | Unacceptable |
| New Tunnel Through Left Abutment | Conditionally Unacceptable | Satisfactory |
| Integrated Facility | Satisfactory | Satisfactory |

# Route Options

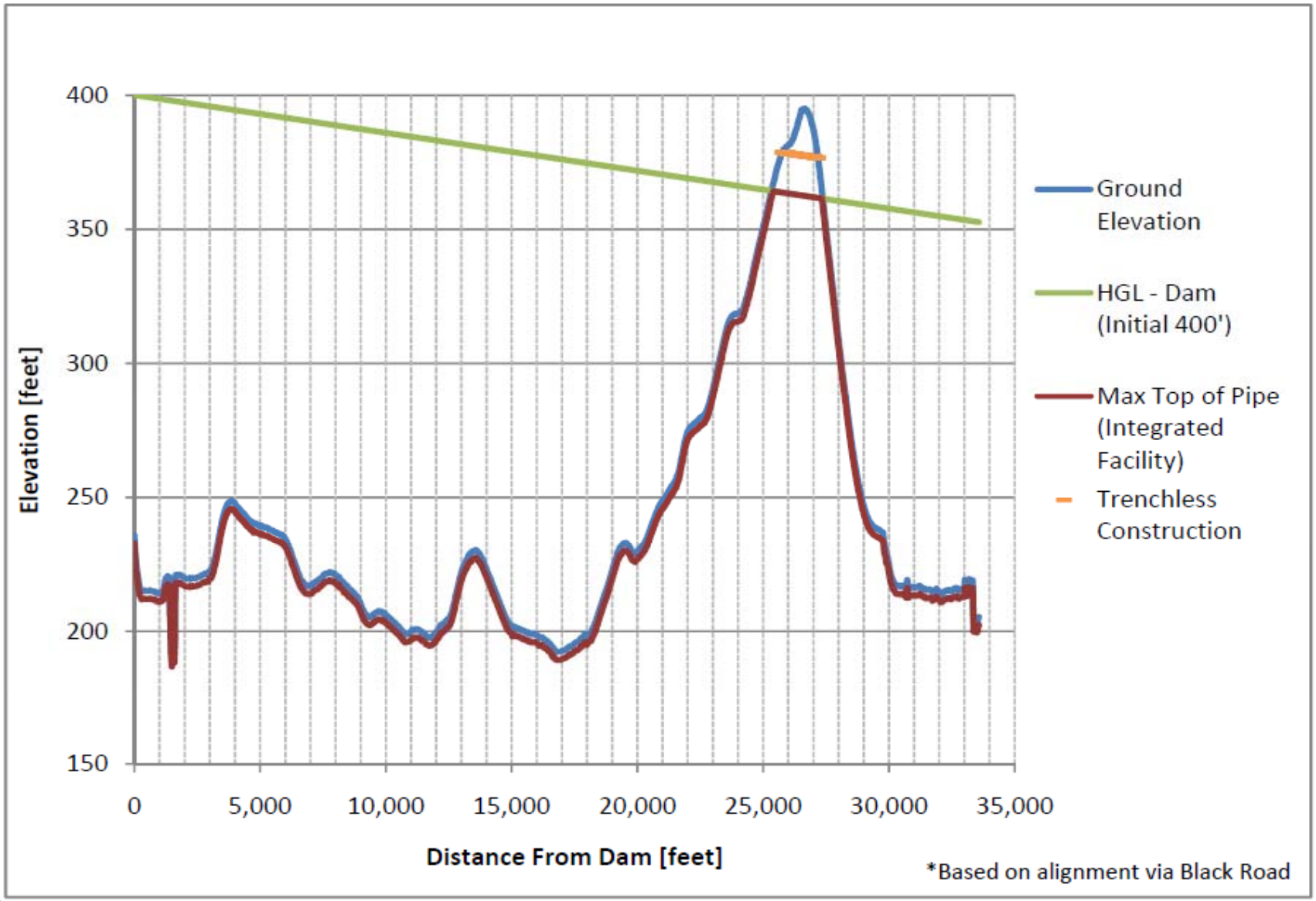
- Northern
  - Canyon Rd
- Central
  - Dry Creek Rd
  - W. Dry Creek Rd
  - Paralleling Dry Creek
- Southern
  - Westside Rd



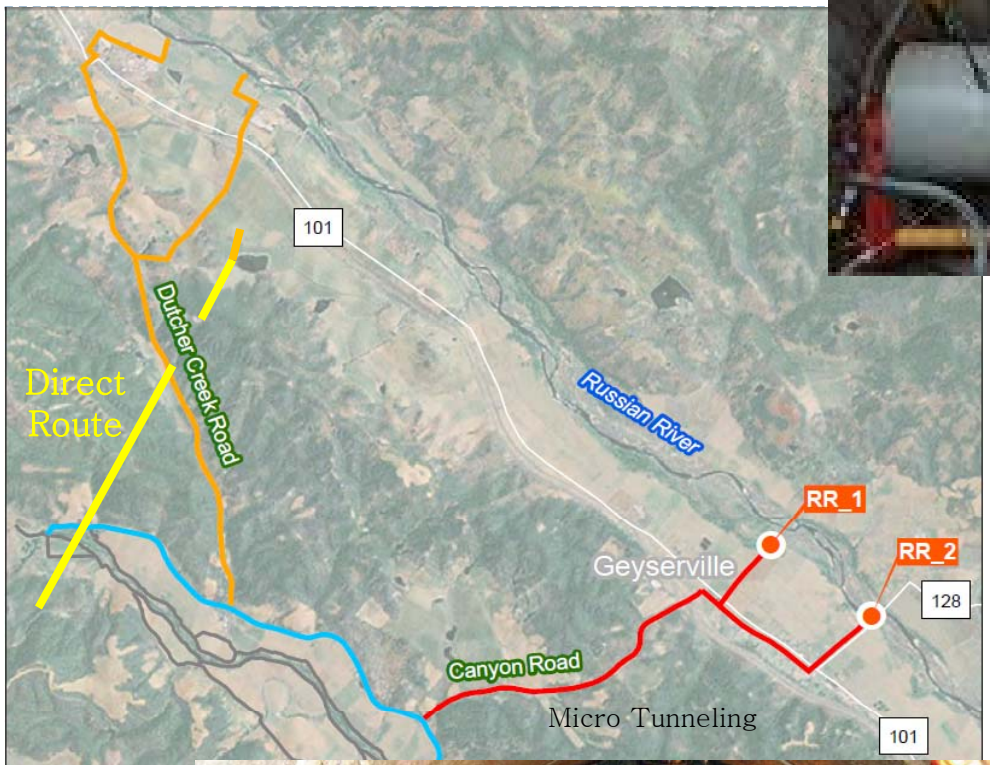
# Hydraulic Profiles of Dutcher Creek Rd



# Hydraulic Profile Canyon Road

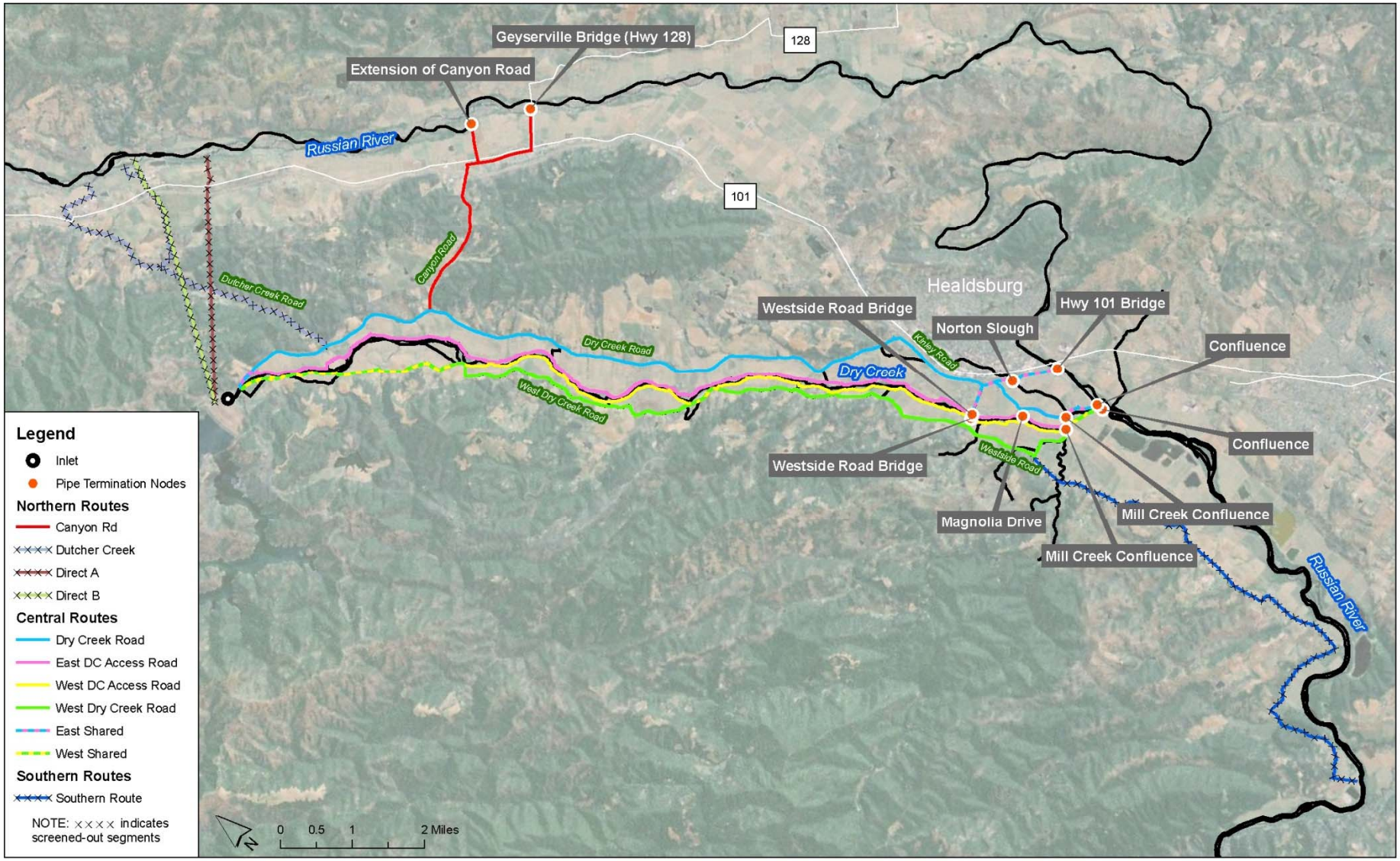


# Northern Routes



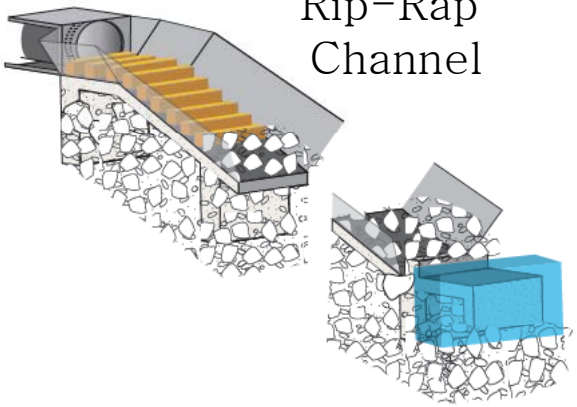

Hard Rock Tunneling

# Route Screening & Outlet Sites

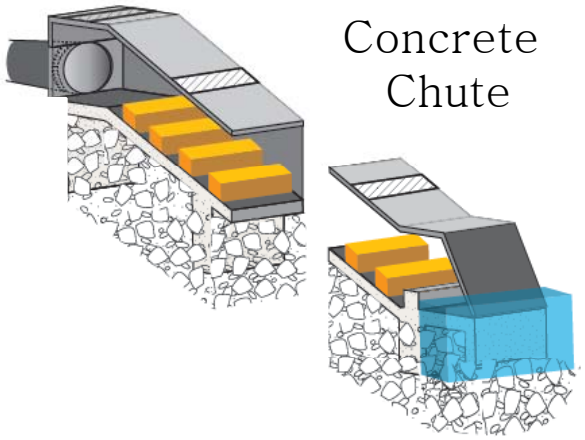


# Outlet Facility Options

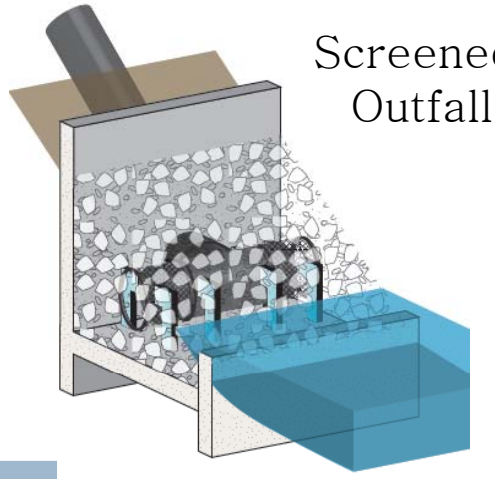
## Riverbank Outfalls



Rip-Rap Channel

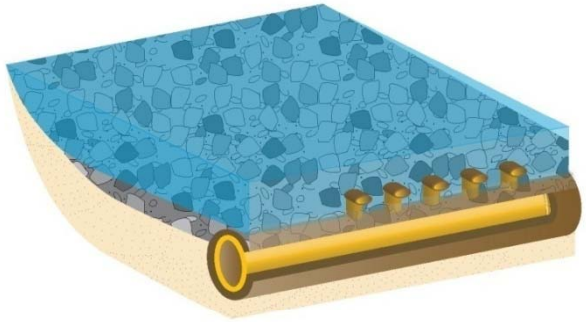


Concrete Chute

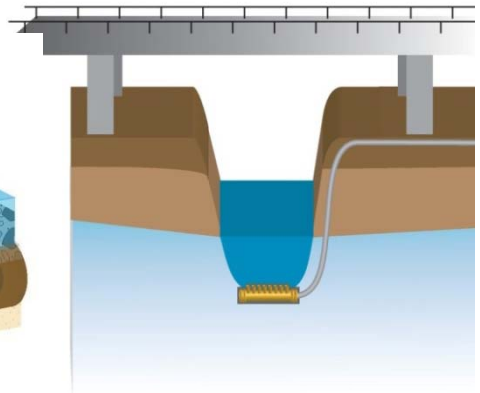


Screened Outfall

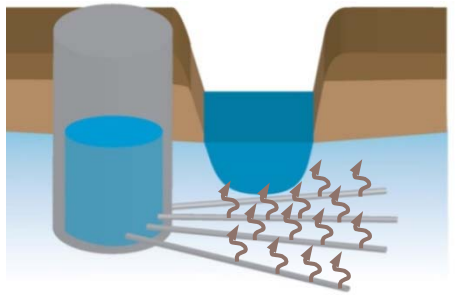
## Diffusers



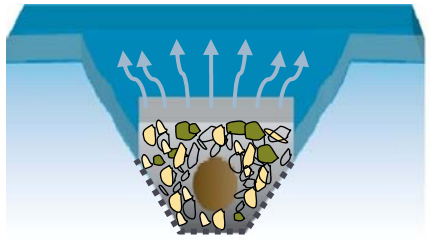
In-River Diffuser



Bridge Pier



Radial Injection Well



In-Bed or In-Bank

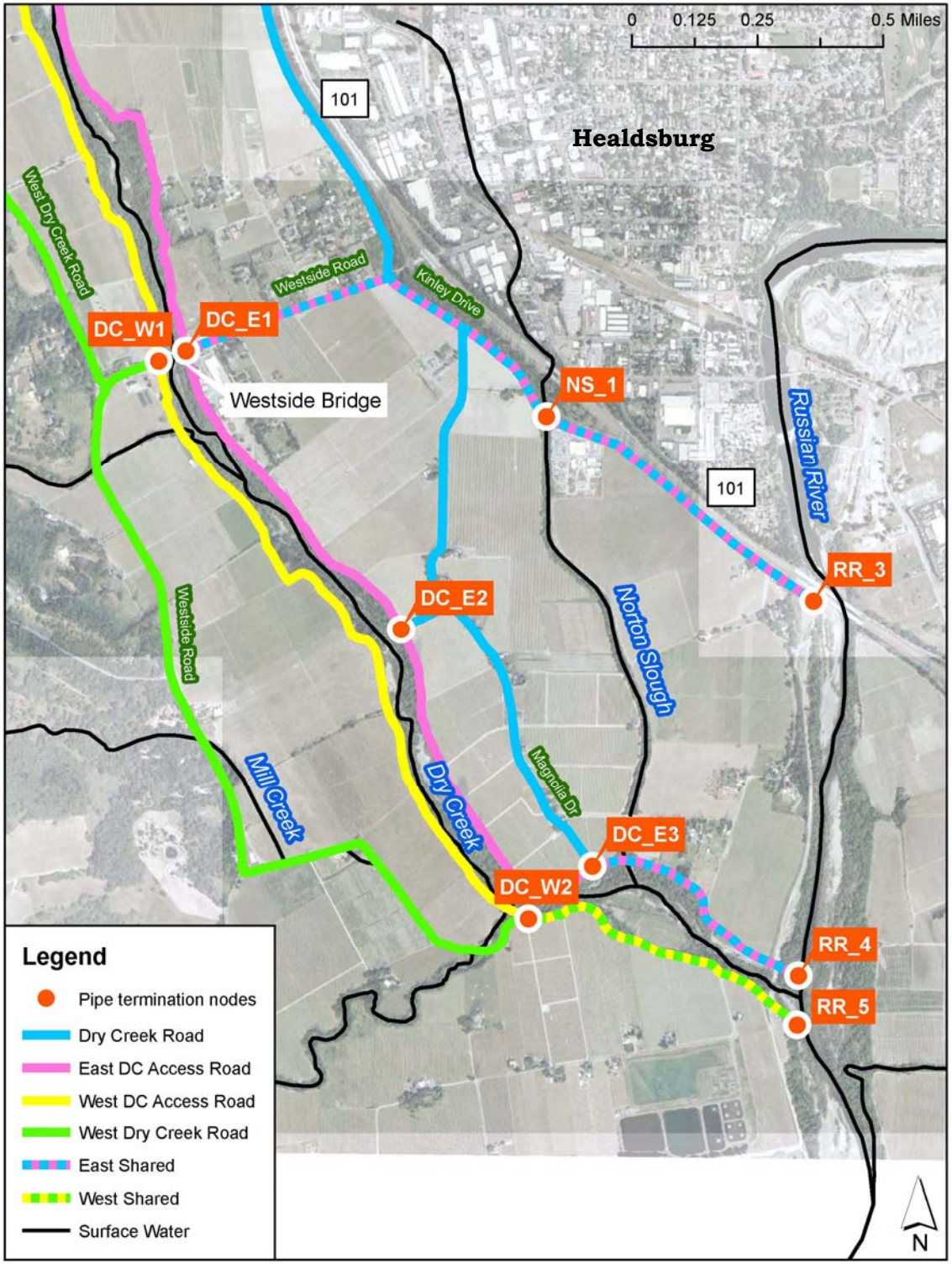
# Outfall Type Screening

| Outlet Facility | Engineering Criteria | Fisheries Criteria |
|---|---|---|
| **Riverbank Outfalls** | | |
| Riprap River Riverbank Outfall | Excellent | Satisfactory |
| Concrete Chute Riverbank Outfall | Excellent | Poor |
| Screened | Excellent | Excellent |
| **In-River Diffusers** | | |
| Typical In-River Diffuser Installation | Satisfactory | Poor |
| Microtunnel In-River Diffuser Installation | Satisfactory | Satisfactory |
| Bridge Pier In-River Diffuser Installation | Satisfactory | Poor |
| **In-Bed Diffusers** | | |
| Without Engineered Backfill | Poor | Excellent |
| With Engineered Backfill | Poor | Excellent |
| **In-Bank Diffusers** | | |
| Typical In-Bank Diffusers Installation | Poor | Excellent |

- Engineering Criteria
  - Relative Cost
  - Ease of Operation
  - Timing and Reliability
  - Ease of Construction
  - Capacity
  - Water Quality Impact
  - Visual Impact
- Fish Criteria
  - Dissolved Oxygen
  - Temperature
  - Erosion
  - Predator Habitat
  - Bank Habitat
  - Channel Dynamics
  - Construction

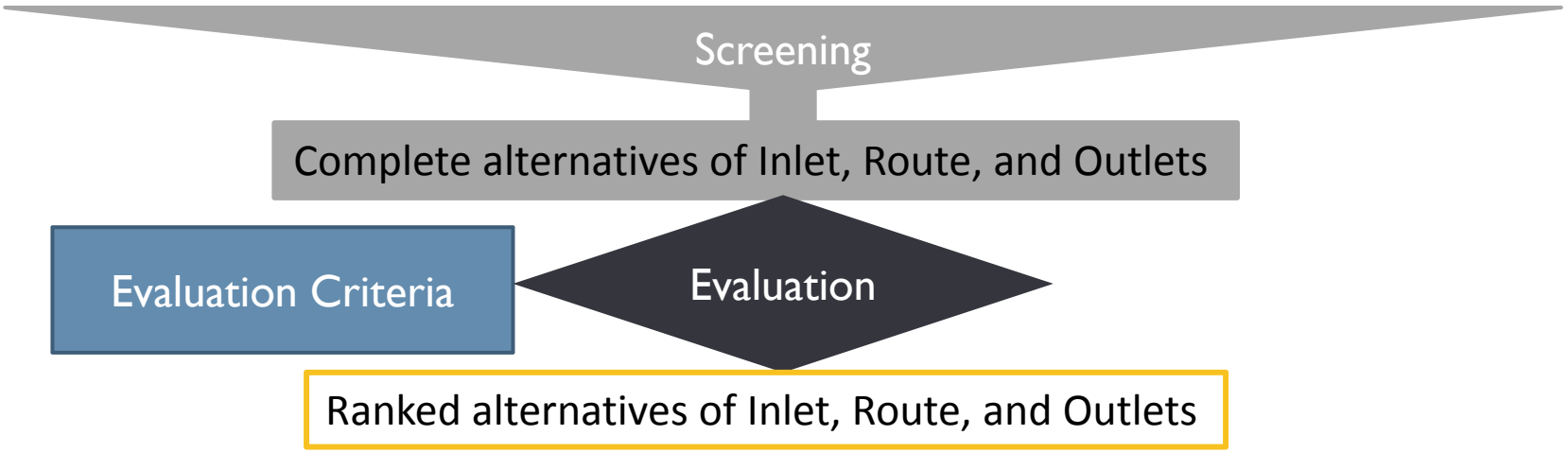
# Outlet Locations*

*2 other locations on Russian River near Geyserville



# Screening and Evaluation Process

| Inlet Options | Pipeline Routes | Outlet Options |
|---|---|---|
| Headbox at Stilling Basin | Northern | Dry Creek |
| Tie to Existing Control Structure | Central | Russian River |



# Evaluation Criteria

| Inlet Facility | Pipeline Route | Outlet Facility |
|---|---|---|
| | Engineering | |
| Reliability | Reliability | Reliability |
| Constructability | Constructability | Constructability |
| Permitting | Permitting | Permitting |
| Operations | Operations | Operations |
| Right of Way Acquisition | Right of Way Acquisition | Right of Way Acquisition |
| Liquefaction Potential | Liquefaction Potential | Liquefaction Potential |
| | Hydropower Potential | River Channel Stability |
| | Special Crossings | Accessibility |
| | Environmental | |
| Wetlands | Wetlands | Wetlands |
| Habitats and Sensitive Species | Habitats and Sensitive Species | Habitats and Sensitive Species |
| Hazardous materials | Hazardous materials | Hazardous materials |
| Cultural Resources | Cultural Resources | Cultural Resources |
| | Impact to trees (roots) | Water Quality/Fisheries |

# Preferred Alternative

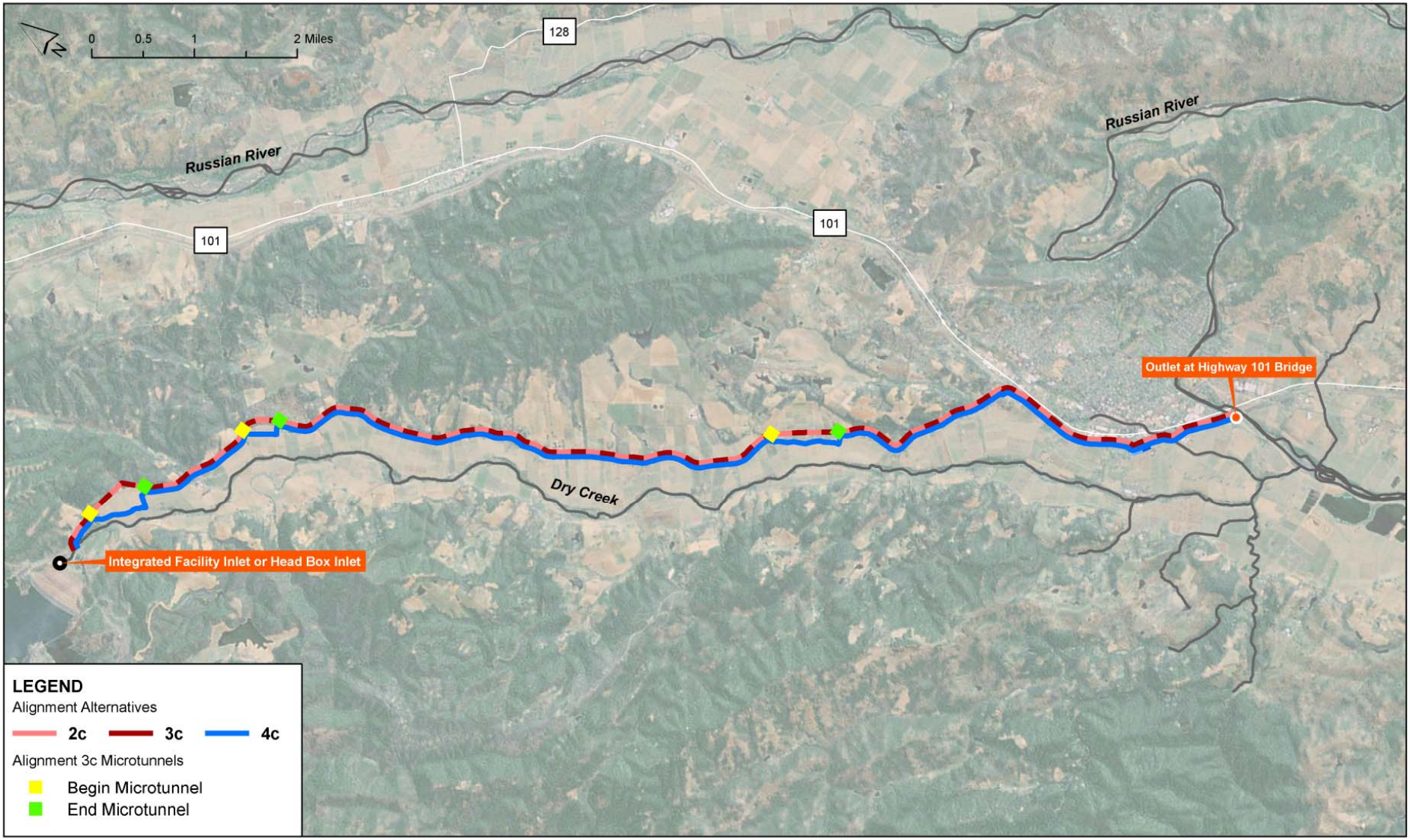
- Inlet – Headbox at Existing Stilling Basin
  - Cost is significantly less than Integrated Facility
- Pipeline Alignment – Dry Creek Road with Microtunnels
  - Constructability and Tree Loss
  - Right of Way Acquisition
  - Less Riparian Disruption
- Outlet Location – Adjacent to Highway 101 Bridge at the Russian River
  - River Channel Stability
  - Operations

# Preferred Inlet

## Head Box Structure

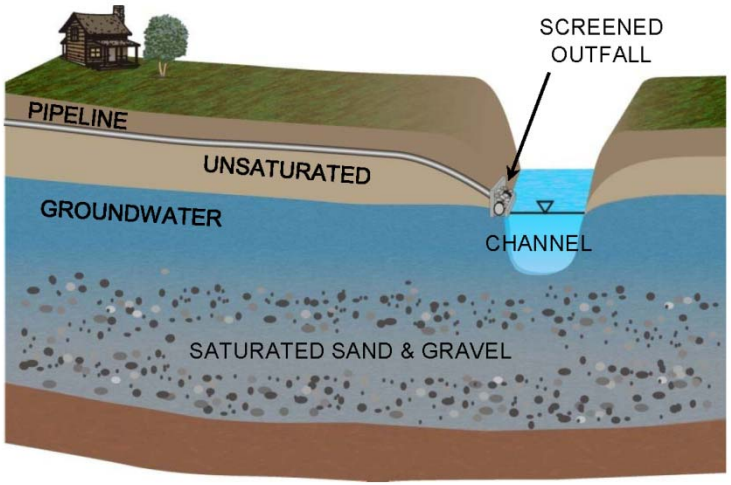
# Preferred Alignment

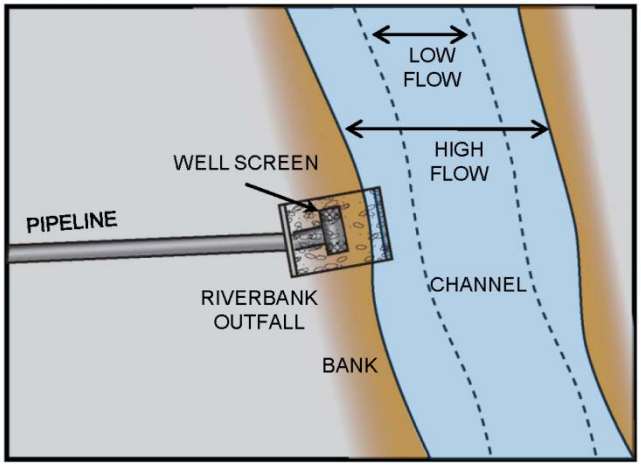
## Dry Creek Road to Russian River at Hwy 101

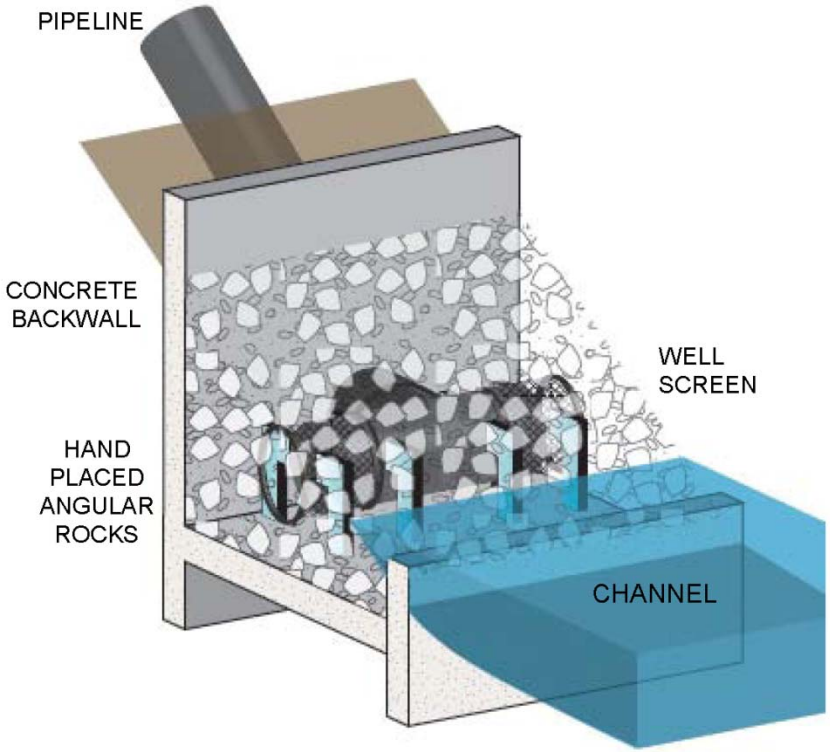


# Preferred Outlet

## Screened Outfall Adjacent to Hwy 101 Bridge



# Opinion of Estimated Costs

| Item | Cost ($ Millions)* |
|---|---|
| Inlet | 2.58 |
| Pipeline | 61.54 |
| Outlet | 4.09 |
| Construction Markups | 38.72 |
| Construction Cost | 106.84 |
| Environmental | 3.55 |
| ROW | 1.22 |
| Subtotal | 111.61 |
| Engineering (10%) | 10.68 |
| Construction Legal (5%) | 5.34 |
| Construction Admin (8%) | 8.55 |
| Owner Admin (5%) | 5.34 |
| **Total Project Cost** | 141.52 |

*Cost is based on construction of a 72-inch bypass pipeline and associated facilities.

# Project Status Update

# Dry Creek Bypass Pipeline Draft Feasibility Study

**HDR**

In collaboration with

**Kennedy Jenks**

May 2010